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EXAMINER

WEBB, GREGORY E

| ART UNIT | PAPER NUMBER |
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1751

DATE MAILED: 09/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/762,500

**Applicant(s)**

VARRIN ET AL.

**Examiner**

Gregory E. Webb

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 22-51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 22-51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

8/29/06

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments filed 6/23/06 have been fully considered but they are not wholly persuasive.
2. The previous ODP rejections are withdrawn based on the applicant's timely filing of the terminal disclaimer.
3. The applicant argues three main points. First, the applicant argues that the prior art fails to teach chelating agents of less than about 1 weight percent. Second, the applicant argues that the prior art composition would not increase the porosity. And finally, the applicant argues that dumping nuclear waste into the environment is considered novel.
4. Concerning the first argument, the examiner strongly disagrees with this statement. The prior art clearly does meet this limitation. For example Rootham teaches the following:

(15) The chemical cleaning solution is a non-corrosive, aqueous solution, preferably of demineralized water, containing cleaning agents including a carrier agent and/or an intercalation agent. The carrier agent (i.e., short chain aliphatic amines) includes at least one compound from the group of lower alkyl amines, most preferably C.sub.1 -C.sub.6 alkyl amines, lower alkanol amines, most preferably C.sub.1 -C.sub.6 alkanol amines, and lower alkoxyalkyl amines, most preferably C.sub.1 -C.sub.6 alkoxy C.sub.1 -C.sub.6 alkyl amines, and combinations and derivatives thereof. The intercalation agent includes at least one compound from the group of cyclic diimines. Most preferably, the aqueous cleaning solution contains at least one carrier agent and at least one intercalation agent. The concentration of the cleaning agents within the aqueous solution is preferably less than 0.5 weight percent, more preferably less than 0.1 weight percent, even more preferably between about 0.0001 and 0.01 weight percent, most preferably between about 0.0005 and 0.005 weight percent.

Clearly the applicant would agree that 0.0005 is less than 1?

5. Baum '657 also teaches concentration which would meet the limitation "less than about 1 weight percent."

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(12) FIG. 3 illustrates another embodiment of this invention which may be particularly useful for nuclear steam generators or other heat exchangers having a primary and secondary side defined by a plurality of tubes which are supported on the secondary side by a plurality of tube support plates spaced apart from the secondary side of the tubes by a plurality of crevice regions. As illustrated in FIG. 1, the tube support plates 39 are spaced apart vertically in the steam generator. In the cleaning process illustrated in FIG. 3, a first cleaning liquid is introduced 40 into the secondary side of the heat exchanger. The first cleaning liquid may contain any number of cleaning agents capable of solubilizing the deposits expected in the heat exchanger; for example, in the case of a nuclear steam generator where ferrous material containing deposits are expected, the cleaning fluid may be water containing ammoniated ethylenediaminetetracetic acid (EDTA) in concentrations, for example, of 25-200 grams/liter or more, depending on the amount of the deposits expected. The amount of cleaning agent used is selected to be sufficient to solubilize a majority of the deposits from the surfaces of the heat exchanger.

Buam '705 also seems to be aware of the benefits of a lower concentration of chelating agent based on the following teaching:

(11) In the present process, much lower concentrations of the acidic constituents are usable since a substantial increase in the flow restricted areas, relative to the remainder of the generator. The use of relatively dilute solutions in the crevice should alleviate the free surface corrosion concerns associated with the use of concentrated cleaning solutions. Bulk concentration between 2-20% of previous recommendations are preferably used. This is a result of the ability to increase the concentration of the solution in the restricted areas, at least about five times, that of the remaining solution in the steam generator.

It does not seem as though a decreased concentration of chelating agent is novel but instead well anticipated by Baum in 1984.

McIntyre also seems to provide a teaching of the applicant's use of a dilute cleaning agent:

(18) The oxidant solution may optionally contain a complexing agent or a chelating agent to minimize the precipitation of copper from the solution prior to its intentional removal. Such agents are commonly present in concentrations from about 0.5 to about 50 weight percent. Suitable agents include, for

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example, alkali metal salts of ethylenediaminetetraacetic acid (EDTA), diethylenetriaminepentaacetic acid (DTPA), N-hydroxyethyl-ethylenediaminetriacetic acid (HEDTA) and ammonia, ammonium ions, triethanolamine, and citric acid.

Banks also seems to make perfectly clear the applicant's claimed range in the following:

(24) The iron complexing agents useful herein include the polyphosphonic acids having the formulas: ##STR1## where R.sub.2 is selected from the class consisting of --H, --PO.sub.3 H.sub.2, C.sub.1 to C.sub.12 alkyl groups, and the group ##STR2## and the alkali metal and amine salts thereof; the alkali metal gluconates; the alkali metal salts of ethylenediaminetetraacetic acid; the ethanolamines and mixtures thereof. Of the polyphosphonic acids, those preferred herein are the acids within the scope of formula (1) above. Specific examples of iron complexing agents useful herein include 1-hydroxyethylidene-1,1-diphosphonic acid, the sodium salt of ethylenediaminetetraacetic acid, sodium gluconate and mixtures thereof.

(25) The quantity of iron complexing agent useful herein is in the range of from about 0.01 to 1.0, preferably 0.05 to 0.5, and still more preferably in the range of from about 0.1 to 0.3 percent complexing agent by weight of solution.

The examiner is quite certain that 0.01 is less than 1.

As for the argument directed to porosity, the examiner is not equipped to measure the prior art ability to "increase porosity." However as the prior art clearly teaches the very important aspect of having less than 1% chelating agent, than clearly these compositions would also inherently meet the porosity limitation as this is argued to be a critical element. Should the applicant feel this argument is incorrect, it is suggested that the applicant provide data to support their arguments.

As for the argument that dumping nuclear waste into the environment is somehow novel, the examiner takes official notice that nuclear dumping of waste has been known since the beginning

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of the study of radioactive isotopes. In fact, Madame Curie (~1910) probably dumped nuclear waste down the sink of her lab.

*Claim Rejections - 35 USC § 102*

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 22-51 are rejected under 35 U.S.C. 102(b) as being anticipated by Banks, William P. (US4045253).

Concerning the claimed method of removing scale, steam generator and the claimed scale, Banks, William P. teaches the following:

In the operation of heat transfer equipment incrustations of contaminants in the form of **scale** usually are formed on the surfaces thereof. Scale formation is especially troublesome in heat transfer equipment having surfaces in contact with water and **steam**, for example, industrial water heating and **steam** generation equipment, despite the fact that in many instances the water employed in such equipment is relatively pure. The incrustations formed on the surfaces in contact with water and **steam** can include **deposits** of copper and iron oxide and certain inorganic salts. Since **scale** can substantially reduce the heat transfer characteristics of the equipment, it is conventional practice to periodically remove the incrustated **scale** from the surfaces by known chemical cleaning processes.  
(*emphasis added*)

Concerning the claimed chelant and the claimed reducing agent, Banks, William P. teaches the following:

Numerous chemical cleaning techniques have been used to effect the removal of the scale incrustations. One common approach is to employ a treatment wherein an aqueous acid solution is utilized to dissolve and/or disintegrate the contaminant deposits. The acids utilized can include the mineral acids, for example, hydrochloric acid and phosphoric acid, and the organic acids, for example **citric** acid, ethylenediaminetetra**acetic** acid and the polyphosphonic acids. (*emphasis added*)

Concerning the claimed pH control agent, Banks, William P. teaches the following:

2. The method of claim 1 wherein said base is selected from the group consisting of sodium hydroxide, potassium hydroxide, sodium carbonate, potassium carbonate, **triethanolamine**, sodium gluconate, sodium borate and mixtures thereof and said iron complexing agent is selected from the group consisting of

**triethanolamine**, sodium gluconate, 1-hydroxyethylidene-1,1-diphosphonic acid, the sodium salt of ethylenediaminetetraacetic acid and mixtures thereof.  
(*emphasis added*)

Concerning the claimed heat exchanger, Banks, William P. teaches the following:

In a typical process for the chemical cleaning of a **steam generator** utilizing an acid solution to remove scale deposits from the ferrous metal surfaces of the generator, an aqueous acid solution containing a corrosion inhibitor and, in some cases, a copper complexing agent, is introduced into the generator to thereby place the acid in contact with the scaled surfaces; the contact is maintained for a time and at a temperature sufficient to dissolve the scale. At the end of the desired treating time the spent acid solution is drained from the generator and an attempt is made to remove any acid remaining in the generator by at least one rinse step wherein the generator is filled with water which is subsequently drained therefrom. This rinse step helps to dilute any acid remaining to thereby at least partially diminish the effect of the acid by removing it from the equipment. The rinsing also helps to remove acid soluble-alkali insoluble material from the equipment. (*emphasis added*)

Concerning the claimed method steps, Banks, William P. teaches the following:

There are generally three types of steam generators, or boilers, utilized in industry: natural circulation boilers, controlled circulation boilers, and once-through (also called super critical) boilers. Liquids in controlled circulation boilers and once-through boilers can be **circulated** with ease while liquids in natural circulation boilers can not. Natural circulation boilers do not have internal circulation pumps which can distribute liquids, such as a passivating solution, throughout. Accordingly, the natural circulation boiler will not achieve sufficient circulation of solutions held therein until a suitable temperature is achieved in it. Such a suitable temperature is ordinarily that of steam at or in excess of about 100 pounds per square inch gauge. The temperature of saturated steam at 100 psig is about 340.degree. F. Accordingly, to achieve adequate circulation of a passivating solution in a natural circulation boiler and hence to achieve adequate contact of the solution with the freshly acid-cleaned surfaces of the generator, it is desirable to heat the passivating solution to a temperature where natural circulation occurs.  
(*emphasis added*)

Concerning the claimed agitating step, Banks, William P. teaches the following:

In preparing the passivating solutions useful in this invention, the order of **mixing** of the chemicals with the water to form the solution is of no known critical importance; however, the presence of dissolved oxygen in the passivating solution is of critical import; accordingly, any method of **mixing** which permits the dissolving of oxygen from, for example, the air, in the passivating solution is encouraged. (*emphasis added*)

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Claims 22-51 are rejected under 35 U.S.C. 102(b) as being anticipated by McIntyre, James A. (US4578162).

Concerning the claimed method of removing scale, claimed reducing agent, claimed heat exchanger, steam generator and the claimed scale, McIntyre, James A. teaches the following:

The pH of the iron removal solution was adjusted to pH 4. $\pm$ .0.1 using **citric acid** and  $\text{NH}_4\text{OH}$ , as required. The solution was pumped through a **heat exchanger** where its temperature was increased to about 90.degree.-95.degree. C. and was then cycled and recycled through the **steam** boiler in a manner to contact the copper-iron mixture. At least a portion of the iron in the **sludge** was ionized and dissolved into the solution. The solution was then removed from the **steam generator**. The **steam generator** was rinsed with the water and the copper **removing** solution was then used again in the manner described earlier. (*emphasis added*)

Concerning the claimed chelant and the claimed pH control agent, McIntyre, James A. teaches the following:

The oxidant solution may optionally contain a complexing agent or a chelating agent to minimize the precipitation of copper from the solution prior to its intentional removal. Such agents are commonly present in concentrations from about 0.5 to about 50 weight percent. Suitable agents include, for example, alkali metal salts of ethylenediaminetetraacetic acid (**EDTA**), diethylenetriaminepentaacetic acid (DTPA), N-hydroxyethyl-ethylenediaminetriacetic acid (**HEDTA**) and ammonia, ammonium ions, **triethanolamine**, and citric acid. (*emphasis added*)

Concerning the claimed method steps, McIntyre, James A. teaches the following:

With the steam generator vented to prevent the build up of pressure, the copper oxidant solution at ambient temperature was pumped through the steam generator in a manner to contact the copper-iron deposit. The flow rate was adjusted to about 0.5 gallon per minute. The solution was **circulated** through the steam generator until a portion of the copper was ionized and dissolved into the solution. The oxidant solution was then pumped into an electroplating cell. The cell had anodes and cathodes composed of nickel screens (20 mesh screens, 0.007 inch Ni wire) supported by a 1/16 inch thick nickel window-frame shaped support. Each electrode was connected to a direct current power supply through a nickel foil electrical lead and a copper wire. The electrodes were held in place with 1/4 inch nylon nuts and 1/4 inch threaded rods. A polypropylene screen was placed between the anode and the cathode to insure that the electrodes did not physically contact each other. The DC power supply was adjusted to 50 amps. Initially the reference electrode showed a reading of -300 millivolts (mv). At this reading, residual oxidant was being decomposed. The readings slowly decreased to about -500 mv and the copper began to plate onto the cathode. As the copper ions in the solution became depleted, the readings decreased to about -900 mv. The current was then reduced to maintain the electroplating cell at a potential more anodic



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than about -900 mv to prevent powdering and flaking of the copper from the plates. (*emphasis added*)

Concerning the claimed agitating step, McIntyre, James A. teaches the following:

A convenient means for minimizing the possibility of a runaway decomposition reaction of the oxidant is by determining the concentration of copper ions which will cause a runaway reaction in a given oxidant solution and keeping the copper ions below that concentration. This may be determined by conducting a series of laboratory experiments wherein a solution containing a known concentration of copper ions is slowly added to a solution containing a known amount, and concentration, of oxidant. As the copper solution is added, the mixture is constantly **agitated** and the temperature rise is monitored. A runaway reaction is indicated by a rapid rise in the temperature of the mixture. This data may be used to calculate the approximate metal ion concentration which caused the runaway reaction in an oxidant solution of a known concentration and used in one of the above described methods to minimize the possibility of a runaway reaction. (*emphasis added*)

Claims 22-51 are rejected under 35 U.S.C. 102(b) as being anticipated by Baum, Allen J. (US4632705).

Concerning the claimed method of removing scale, claimed chelant, claimed pH control agent and the claimed heat exchanger, Baum, Allen J. teaches the following:

In the present process, an aqueous solution of an organic cleaning agent is charged to the secondary side of the **steam generator** while the plant is at cold shutdown. The organic cleaning agents are selected from conventional cleaning agents useful in solubilizing **deposits** formed in a **steam generator**, and will vary depending upon the particular **deposits** that are to be removed from the generator and upon the constituents occupying the pores of the deposit. In the removal of unconsolidated iron bearing **sludge deposits**, a useful solution would comprise ethylenediaminetetraacetic acid (**EDTA**), hydrazine, a corrosion inhibitor, ammonium hydroxide and a dispersant, in water. For the removal of consolidated iron **deposits**, the above solution would be usable by substituting **triethanolamine** for the ammonium hydroxide. (*emphasis added*)

Concerning the claimed reducing agent, Baum, Allen J. teaches the following:

In instances where the removal of deposits from the tubesheet crevices, those crevices between the heat transfer tubes and the tubesheet, is specifically desired, a useful solution would comprise EDTA, **citric acid**, **ascorbic acid**, **hydrazine**, a hydroxy substituted amine such as tetrakis (2-hydroxypropyl ethylenediamine), a surfactant, a corrosion inhibitor, and triethanolamine, in water. (*emphasis added*)

Concerning the claimed method steps, claimed agitating step, steam generator and the claimed scale, Baum, Allen J. teaches the following:

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Since deposits are still accumulated in the secondary side of the **steam generator**, **flushing** operations have been proposed to periodically remove as much of the dissolved impurities from the flow restricted areas as possible. Such a **flushing** operation may be effected by **introducing** a quantity of water into the secondary side of the **steam generator** while the pressurized water reactor system is at cold shutdown, applying a nitrogen over-pressure, heating the **steam generator** to about 140.degree. C. using the reactor coolant pumps, and then depressurizing the generator by opening of power-operated relief valves. The valves are subsequently closed and the cycle is repeated. Such a procedure helps to remove **sludge** from the tubesheet and from crevices found in the secondary side.  
(*emphasis added*)

Claims 22-51 are rejected under 35 U.S.C. 102(b) as being anticipated by Rootham, Michael W. (US5764717).

Concerning the claimed method of removing scale, claimed heat exchanger and the claimed method steps, Rootham, Michael W. teaches the following:

Generally speaking, the invention is an improved method for chemically **removing scale, sludge**, corrosion and other **deposits** from the interior of a **heat exchanger** vessel such as the interior of the secondary side of a nuclear **steam generator** that eliminates or at least ameliorates shortcomings associated with the prior art. The method of the invention generally comprises the steps of **introducing** an aqueous solution of water soluble, strongly basic amines into the interior of a **heat exchanger** vessel, which may be the secondary side of a nuclear **steam generator**, to dislodge, dissolve and fluidize the **sludge** and **deposits** at the interior of the secondary side, to inhibit resettling of solubilized or loosened **sludge** and **deposits** within the interior of the secondary side, and to further inhibit reforming of new **sludge** and **deposits** within the interior of the secondary side. (*emphasis added*)

Concerning the claimed chelant and the claimed reducing agent, Rootham, Michael W. teaches the following:

Chemical cleaning methods were developed in the prior art to dissolve such scale and sludge accumulation, and to ameliorate corrosion. In one of these methods, the nuclear steam generator is first taken out of service and completely drained of water from both the primary and secondary sides. Next, whereas most of the corrosion products contained in the crevice region and tube scales are iron oxide and copper and that have become tightly ensconced in the crevice regions or on the surfaces of the heat exchanger tubes, chelate-containing iron and copper removal solvents are sequentially introduced into the interior side to dissolve and remove the impurities. Such iron removal solvents typically include an aqueous mixture of **ethylenediamine tetraacetic acid (EDTA)**, **hydrazine**, ammonium hydroxide, and an inhibitor for retarding corrosion reactions between the metal surfaces in the generator and **EDTA**. The copper solvent likewise includes an

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aqueous mixture of **EDTA**, ammonium hydroxide, and further includes hydrogen peroxide and ethylene diamine (EDA). (*emphasis added*)

Concerning the claimed pH control agent, Rootham, Michael W. teaches the following:

in which said aqueous cleaning solution comprises a cleaning agent from at least one of the group consisting of a carrier agent and an intercalation agent, or a combination thereof, wherein said carrier agent is selected from the group consisting of **dimethylamine**, **ethylamine**, **1,2-diaminoethane**, and **diaminopropane**, **ethanolamine**, 2-methyl-2-amino-1-propanol, **5-aminopentanol**, and **methoxypropylamine**. (*emphasis added*)

Concerning the claimed agitating step, steam generator and the claimed scale, Rootham, Michael W. teaches the following:

This invention generally relates to a method for the removal of **scale**, **sludge**, corrosion and other deposits from heat transfer equipment surfaces, such as in boilers and heat exchangers in **steam** generation systems, which surfaces are in contact with aqueous systems. More particularly the invention relates to an improved method for the removal of **scale**, **sludge**, corrosion and other deposits from the interior surfaces of heat exchanger vessels, in particular, the interior of the secondary side of nuclear **steam generators**, by treating the **scale** and other deposits with aqueous solutions containing water soluble, strongly basic amines to dislodge, dissolve and fluidize, the **scale** and other deposits. The invention is particularly useful during off-line nuclear **steam generator** cleaning operations including pressure pulse cleaning operations and bundle flush followed by **inert gas sparging** cleaning operations. (*emphasis added*)

7.

Claims 22-51 are rejected under 35 U.S.C. 102(b) as being anticipated by Baum, Allen J. (US5601657).

Concerning the claimed method of removing scale and the claimed scale, Baum, Allen J. teaches the following:

Sludge and deposit accumulations are undesirable because they interfere with the heat transfer process and because they provide low flow regions which can serve to accelerate corrosion of the heat exchanger components. Accumulated **sludge** and **deposits** may be removed from the heat exchanger during scheduled maintenance outages. Mechanical techniques for loosening the **sludge** are limited by the amount of force which can safely be exerted on the heat exchanger components. Chemical cleaning agents are often ineffective in penetrating the **deposits** located within crevice regions because the amount of active cleaning agent in solution is depleted by the large surface area of **deposits** and **sludge** available to the cleaning solution in the bulk volume of the heat exchanger. (*emphasis added*)

Concerning the claimed chelant, Baum, Allen J. teaches the following:

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An improved method of cleaning a heat exchanger is illustrated by the flow chart of FIG. 2. The first step 21 of this improved process is to introduce a first liquid containing a cleaning agent in the heat exchanger. The liquid is typically water, and the cleaning agent may be one or more chemicals known in the art; for example, **EDTA**, **NTA**, or gluconic acid. Typical concentrations of the cleaning agent may be from approximately 2% to 10% by weight, and are preferably from approximately 5% to 8% by weight. Concentrations may be as high as 20% for some heat exchangers with a high sludge burden. (*emphasis added*)

Concerning the claimed reducing agent, Baum, Allen J. teaches the following:

After the first cleaning liquid has solubilized a majority of the surface deposits in the heat exchanger, and preferably after a portion of the first cleaning liquid has been removed, a second cleaning liquid may be introduced 52 into the secondary side of the heat exchanger. The second cleaning liquid may be the same as, or different from, the first cleaning liquid; for example water containing **EDTA** in the same or a different concentration, or containing the same or different additives for example to obtain the same or different pH values. The amount of cleaning agent used is preferably sufficient or in excess of the amount needed to solubilize a majority of the remaining deposits from the crevice regions. In nuclear steam generator applications, it may be desirable to use water containing a cleaning agent for removing ferrous deposits from the secondary side surfaces as the first cleaning liquid, and water containing a cleaning agent for removing copper deposits as the second cleaning liquid. Generally, the second cleaning liquid can be more aggressive than the first cleaning liquid, since the concern for corrosion will be lessened by the cleaning action of the first cleaning liquid. Other cleaning agents which may be used include organic acids and salts thereof, including hydroxyethylethylenediaminetriacetic acid (**HEDTA**), diethylenetriaminepantascetic acid (**DTPA**), nitrilotriacetic acid (**NTA**), **citric acid**, gluconic acid, glutamic acid, polyamines and phosphonate blends, propylenediaminetetrascetic acid (**PDTA**), and 1,2 cyclohexylenediaminetetraacetic acid (**CYDTA**). (*emphasis added*)

Concerning the claimed heat exchanger and the steam generator, Baum, Allen J. teaches the following:

FIG. 3 illustrates another embodiment of this invention which may be particularly useful for nuclear **steam generators** or other **heat exchangers** having a primary and secondary side defined by a plurality of tubes which are supported on the secondary sided by a plurality of tube support plates spaced apart from the secondary side of the tubes by a plurality of crevice regions. As illustrated in FIG. 1, the tube support plates 39 are spaced apart vertically in the **steam generator**. In the cleaning process illustrated in FIG. 3, a first cleaning liquid is introduced 40 into the secondary side of the **heat exchanger**. The first cleaning liquid may contain any number of cleaning agents capable of solubilizing the deposits expected in the **heat exchanger**; for example, in the case of a nuclear **steam generator** where ferrous material containing deposits are expected, the cleaning

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fluid may be water containing ammoniated ethylenediaminetetracetic acid (EDTA) in concentrations, for example, of 25-200 grams/liter or more, depending on the amount of the deposits expected. The amount of cleaning agent used is selected to be sufficient to solubilize a majority of the deposits from the surfaces of the **heat exchanger**. (*emphasis added*)

Concerning the claimed method steps and the claimed agitating step, Baum, Allen J. teaches the following:

The second liquid is then removed from the heat exchanger in step 35. Further steps 37 of **introducing** additional liquids into the heat exchanger in succession may be utilized as necessary for further cleaning and/or **flushing**; for example, for a copper removal step. If additional liquids are used for cleaning, the concentration of cleaning agents and/or the duration of exposure of the heat exchanger to the cleaning agent can be increased for each succeeding liquid, since the heat exchanger will become increasingly clean as total inventory of sludge and deposits is gradually removed from the heat exchanger by the successive liquids. This reduction of sludge results in a reduction of free ferric ions, thereby reducing the potential for galvanic corrosion of the heat exchanger components from the successively higher concentrations of cleaning agents. (*emphasis added*)

### ***Conclusion***

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory E. Webb whose telephone number is 571-272-1325.

The examiner can normally be reached on 9:00-17:30 (m-f).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglass McGinty can be reached on (571)272-1029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Gregory E. Webb  
Primary Examiner  
Art Unit 1751

gew